

Efficient Space Hardy Thermoelectric Materials with Broad Temperature Range, Phase I

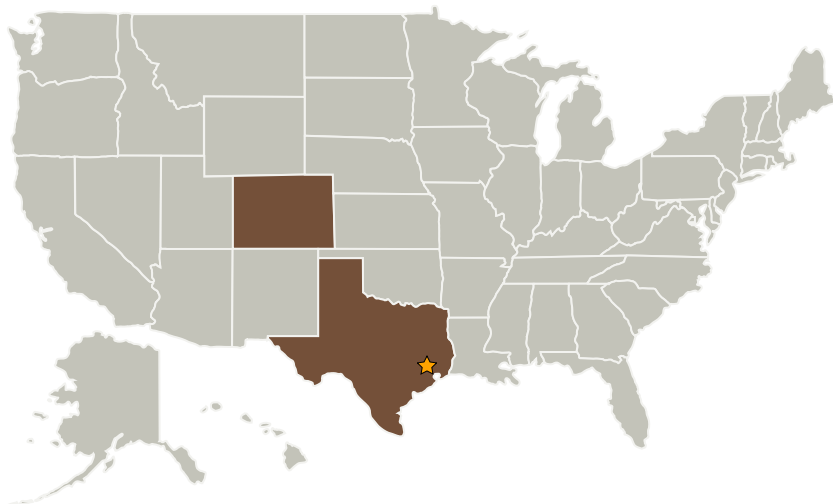
Completed Technology Project (2008 - 2008)



Project Introduction

The goal of this work is developing new thermoelectric materials for use in fabricating solid state cooling devices and electrical power generators, which are 200 to 300% more efficient than current thermoelectric materials and can operate in temperatures ranging from cryogenic to 700 C. These materials will be made from new nano-composites, using fabrication techniques developed at Eltron. The proposed thermoelectric composite's matrix has already demonstrated exceptional ability for functioning in the environment of space. Used in a cooling system, these materials will provide an effective means for controlling the temperature of surfaces subject to the rapidly changing temperatures encountered in space. They can be used to prevent development of large temperature gradients and thereby prevent the mechanical stresses that accompany them. Used for power-generation, these new materials will be very efficient both because of the properties that the nano-phase materials and its matrix bring to the thermoelectric material. Because of the difficulties presented in the harsh environment of space, thermal management and power generation is most easily provided through devices that do not have any moving parts, are very durable, do not require maintenance, and operate efficiently over a wide range of temperatures. The proposed materials meet all these requirements.

Primary U.S. Work Locations and Key Partners



Efficient Space Hardy
Thermoelectric Materials with
Broad Temperature Range,
Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

Efficient Space Hardy Thermoelectric Materials with Broad Temperature Range, Phase I

Completed Technology Project (2008 - 2008)



Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Eltron Research & Development, Inc.	Supporting Organization	Industry	Boulder, Colorado

Primary U.S. Work Locations

Colorado	Texas
----------	-------

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Richard Bley

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.1 Materials
 - └ TX12.1.6 Materials for Electrical Power Generation, Energy Storage, Power Distribution and Electrical Machines